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CERN	**CODE DE SÉCURITÉ** **SAFETY CODE**	**C1**

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CODE DE SECURITE RELATIF A L'ELECTRICITE

ELECTRICAL SAFETY CODE

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Contents

1 LEGAL BASIS

This code is based on the document which defines safety policy at CERN (SAPOCO/42). It forms part of the CERN safety regulations and, as such, part of the Staff Regulations.

2 AIMS

The aim of this code is to establish regulations for the construction, installation and use of electrical equipment which guarantee the protection of personnel and property.

It will be supplemented by Safety Instructions and Safety Notes.*

3 SCOPE

This code applies:

- to all persons under the Director-General's authority (including contractors and experimental groups, as stated in document SAPOCO/42.

- on all CERN sites and to all electrical equipment and installations which are CERN's responsibility.

4 GENERAL DEFINITIONS

Electrical equipment: any item used for such purposes as generation, conversion, distribution or utilization of electrical energy, e.g. machines, transformers, apparatus, measuring instruments, protective devices, wiring material, appliances and electronic equipment.

Electrical installation: any combination of interconnected electrical equipment within a given space or location.

Non-standard electrical equipment or installation: electrical equipment or installations not covered by a specific national or international standard.

* Safety Instructions are mandatory, while Safety Notes are for information

5 REGULATIONS AND STANDARDS FOR ELECTRICAL EQUIPMENT AND INSTALLATIONS

The most recent IEC or CENELEC* standards and recommendations constitute the basic regulations governing electrical equipment and installations at CERN.

Electrical equipment: this must be manufactured and tested in accordance with IEC publications, supplemented if necessary by the standards of the country of origin.

Electrical installations: these must comply with IEC publications, especially publication No 364 (Electrical installations of buildings), supplemented by other regulations, listed in the Safety Instruction N°24 "Regulations applicable to electrical installations".

Non-standard electrical equipment and installations: as far as possible, these should be developed, manufactured and tested according to the same rules governing standard equipment and installations using a similar technology. In all cases, the provisions of the section "Protection of Personnel" must be respected, in order to achieve a degree of safety equivalent to that of standard equipment or installations (cf Annex).

6 PERSONNEL QUALIFICATIONS

Everyone required to work on dangerous electrical equipment or installations must be qualified, i.e.:

- be technically competent (training approved by a national organization or professional experience recognised by CERN),
- know the safety regulations applying to the installations concerned;
- know what to do in an emergency and how to give first aid in cases of electric shock.

It is each Division's responsibility to ensure that personnel are properly qualified. Personnel qualifications must be reviewed periodically to make sure that personnel are still competent to carry out the tasks which they have been given.

Divisions introducing a licensing system should, as far as possible, use publication UTE ** C 18.510 ("Modèle de recueil de prescriptions de sécurité").

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* = International Electronical Commission, CENELEC = European Committee for Electrotechnical Standards

**UTE = Union Technique de l'Electricité (Sample Summary of Safety Regulations, in French only

7 PROTECTION OF PERSONNEL

Electrical equipment or installations are considered safe for personnel if no dangerous accidental contact can be made with any live or potentially live component (Ref. IS 28).

8 CHOICE OF EQUIPMENT

The equipment must ensure the protection of personnel and property at all times.

In addition to the rated operating conditions, the equipment must be able to withstand the abnormal conditions created by the surroundings and the power supply network during normal or defective operation.

In order to comply with the above, the following points must be observed in the design, specification and installation of the equipment :

- The equipment must be suitable for the rated operating conditions and be able to withstand transient phenomena (overvoltage, voltage drop, power failure, excess current during short-circuiting,...) and abnormal states (harmonic overload, monitoring failure...) during the period these conditions exist, without a noticeable degradation in the degree of safety.

- The degree of protection provided by enclosures (as given in publication IEC 529) must be suitable for the particular environment of the equipment and the frequentation of the area housing the material (Ref. IS 23 and Radiation Protection Manual).

- Equipment affording the highest degree of fire resistance should be chosen. It should not promote the spread of flames, nor give off dense smoke or corrosive or toxic fumes (Ref. IS 23).

- The amount of toxic or polluting substances which could escape in the surroundings if the casing of the equipment should leak or split must remain within safe limits for personnel (Ref. IS 23).

If the equipment does not comply with the rules in the two previous paragraphs, it must have an enclosure which reduces the risks specified in these paragraphs (e.g. oil extinction and recovery pits, fire-walls for mineral oil-filled transformers).

It is the responsibility of the Group Leader to ensure that the equipment specification is in accordance with the above rules.

9 OPERATING INSTRUCTIONS

The group responsible for an electrical installation will draw up all the necessary instructions for the safe operation of the installation. These instructions must be made known to everyone concerned.

Publication UTE C 18-510 ("Modèle de recueil de prescriptions de sécurité") must serve as a guide in drawing up the instructions.

10 INSPECTION OF ELECTRICAL EQUIPMENT AND INSTALLATIONS AND OF THEIR OPERATING CONDITIONS

Safety regulations must be taken into account right from the initial conception stage of electrical equipment and installations.

In particular, the design of electrical installations must comply with CERN regulations concerning emergency stops (Ref. IS 5).

Moreover, electrical equipment and installations must be inspected before they are first used,after any major modifications and subsequently at suitable intervals :

- Before putting into service, inspections must be carried out by those responsible for the construction and operation of the equipment. They must be recorded.

- Users are responsible for carrying out and recording regular inspections.

11 SURVEILLANCE OF THE APPLICATION OF THIS CODE

The TIS Division is empowered to check by any means it may consider necessary that this code is being respected.

The TIS Division may call upon external organisations to carry out this task.

The use of any existing standard not mentioned in this Code must be approved by the TIS Division before it is used.

12 ENTRY INTO FORCE

This code enters into force on the date of publication.

ANNEX

List of References

IS 24	Regulations applicable to electrical installations (1984)
IS 5	Emergency stops (1985)
IS 23/Rev. 2	Criteria and standard test methods for the selection of electric cables, wires and insulated parts with respect to fire safety and radiation resistance (1992)
Code A3/Rev.	Colour Code (under revision)
IS 28	Dangers due to electricity (1986)
IS 26	Electrical test bays (1986)
IS 33	Definition of voltages and insulation levels (1986)
IS 27	Electronics laboratories (1985)
Code G/Rev.	CERN Flammable Gas Safety Code (1981)
NS 13	Explosion protection of electrical apparatus in experimental areas (1986)

Radiation Protection Manual CERN (1996)